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(54) **NON-INVASIVE METHOD AND SYSTEM OF QUANTIFYING HUMAN POSTURAL STABILITY**

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(57) **ABSTRACT**

A non-invasive method for evaluating a musculoskeletal system of a patient is provided which includes the steps of: providing a vibration measurement device in proximity to a non-rigidly supported platform; measuring a vibrational response of the patient's musculoskeletal system using the vibration measurement device after the patient rests on the non-rigidly supported platform; performing a frequency decomposition of the vibrational response to quantify the vibrational response into specific vibrational spectra; and analyzing the vibrational spectra to evaluate muscle strength, postural stability and bone density. A non-invasive physiologic vibration quantification system is also provided for evaluating the musculoskeletal system of the patient. The system includes vibration means for externally transferring vibrations to the musculoskeletal system and including a vibration measurement device for measuring a response by the musculoskeletal system in accordance with the vibrations transferred by the vibration means and for forming signals representative of the musculoskeletal system response; and an analyzer coupled to the vibration measurement device for receiving the signals from the vibration measurement device and developing a frequency spectrum associated with the signals. The frequency spectrum provides vibrational quantification of the musculoskeletal system for evaluating at least postural stability.

16 Claims, 6 Drawing Sheets